

REMARKS

Pursuant to the present amendment, claims 1, 4-14 and 19-27 have been amended. Claims 1-27 are pending in the present application. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested.

In the Office Action, claims 1 and 8 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Chen (U.S. Patent No. 6,710,358). Claims 13 and 14 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Shubaly (U.S. Patent No. 4,174,834). Claim 23 was rejected under 35 U.S.C. § 102 as allegedly being anticipated by Yu (U.S. Patent No. 6,521,502). Claims 2-10 and 12 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Chen in view of Yu. Claims 11 and 12 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Chen in view of Shubaly. Claims 15-21 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Shubaly in view of Yu. Claim 27 was rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Yu in view of Shubaly. Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should

have, or would have been used as the claimed invention. “The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Oelrich*, at 326, quoting *Hansgirk v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. “Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Skinner*, at 1789, citing *Oelrich*. Where anticipation is found through inherency, the Office’s burden of establishing *prima facie* anticipation includes the burden of providing “...some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art.” *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991; *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

Pursuant to the present amendment, independent claims 1, 13 and 23 have been amended to more precisely define Applicants' invention. For example, claim 1 has been amended to recite that the ion implant tool is operated to ionize a first species including a first dopant, and after that step, the implant tool is operated to ionize xenon as an implant precursor to reduce residues of the first species in the tool, and after the xenon ionization step, the implant tool is operated to ionize a second species including a second dopant. In short, claim 1 is directed to a method wherein ionized xenon is used to clean residues of a first species formed during the first implant step prior to performing a second implant step with a second species.

As thus amended, it is respectfully submitted that independent claim 1 is allowable over the art of record. Chen is understood to be directed to a new ion implant method for low energy implantation to form shallow P- and N-type junctions. Col. 2, l. 63 – Col. 3, l. 8. More specifically, Chen is directed to a new ion beam steering and deceleration method for decelerating a charged ion beam and for separating the neutralized particle beam from the ion beam. The neutralized beam is stopped by a neutral particle stopping block before reaching the target wafer. According to Chen, this minimizes energy contamination from high energy neutralized particles. Abstract.

At no point does Chen disclose or suggest the methodology set forth in claim 1 requiring operation of the tool to ionize a first species, and thereafter operating the tool to ionize xenon, and thereafter operating the tool to ionize a second species including a second dopant. As understood by the undersigned, the xenon gas identified in Chen (Col. 2, ll. 27-40) is provided as a flood source placed between the deceleration optics 35 and the target wafer (see Figure 1) to prevent beam blow-up after deceleration and wafer charging during the implant process. Simply put, at no point does Chen disclose or suggest the three-step ionization process recited in claim 1.

Shubaly is understood to be directed to an improved ion source which has a large area of uniform plasma in a compact and simple design which purports to give reproducible and consistent results. Col. 4, ll. 11-16. The ion beam source in Shubaly comprises a hot cathode filament 1 located in a cathode chamber 3. The device further comprises a primary gas supply inlet 30 and a secondary gas inlet 22. Col. 7, ll. 22-31; Col. 4, ll. 50-56. During operation of the device disclosed therein, a protective cover gas, e.g., argon or xenon, is introduced into a cathode chamber through the primary gas inlet 30 and a cathode filament is heated to produce electrons

for discharge. Col. 9, ll. 58-62. Meanwhile, the reflex arc chamber is fed with a feed gas to be ionized through the secondary gas inlet 22 and a secondary gas passage 21. Col. 10, ll. 13-15. Shubaly notes that it has been described that a gas, *e.g.*, argon or xenon, is supplied in the cathode chamber 3 to protect the filament 1 from being damaged by the feed gas which is supplied by the secondary gas supply means. However, if argon, xenon, nitrogen, hydrogen and neon, or other gases which do not damage the filament in operation, is the gas to be ionized, it can be introduced through the primary gas inlet 30 without the use of the secondary gas inlet 22. Col. 10, ll. 46-57. As thus understood, it is respectfully submitted that Shubaly is quite far afield from the present invention. Shubaly describes a process wherein, in one embodiment, a gas such as xenon is used as a protective cover gas while a certain feed gas provided by the secondary gas inlet 22 is ionized in the reflex arc chamber. Col. 9, ll. 58-63; Col. 10, ll. 13-15. In an alternative mode of operation, Shubaly does note that xenon may be the gas that is to be ionized, but, in that case, Shubaly discloses that the xenon may be introduced through the primary gas inlet 30 without the use of the secondary gas inlet 22. Col. 10, ll. 46-57. Certainly Shubaly does not disclose the three ionization steps now set forth in amended independent claim 1. Thus, it is respectfully submitted that independent claim 1 is allowable over Shubaly.

Yu is directed to a method of forming deep amorphous regions and doping the deep amorphous regions in a semiconducting device. Abstract. Yu does disclose that various amorphization processes can be utilized to form the amorphous regions 25, and that xenon may be used during such an amorphization implant process. However, Yu certainly does not disclose the three-step ionization process now recited in amended independent claim 1.

Moreover, there is no suggestion in Chen, Shubaly or Yu, considered individually or collectively, for the method defined in amended independent claim 1. None of these references, considered individually or collectively, disclose the three-step ionization process set forth in claim 1 wherein the xenon is ionized to reduce residues of the first species in the ion implantation tool. As understood by the undersigned, none of the references discuss aspects of cleaning the ion implant tool between implantation processes in any respect. Thus, it is respectfully submitted that amended independent claim 1, and all claims depending therefrom, are in condition for immediate allowance.

Similar arguments can be made with respect to amended independent claim 13. As recited therein, the ion implantation tool is initially operated to ionize xenon prior to installing the substrate in the implantation tool to reduce contaminating particles. These particles may constitute residue resulting from other previously performed ion implantation processes in the implantation tool. Thereafter, claim 13 recites, after operating the ion implant tool to ionize the xenon, operating the ion implant tool with the substrate mounted therein to ionize and implant a first species of dopant in the substrate. Again, this methodology is not disclosed nor suggested by the art of record. The art of record is completely silent with respect to ionizing xenon in an effort to clean the tool of contamination particles. Dependent claim 14 further limits claim 13 by reciting that the ion implant tool is operated to ionize a second species (other than the first species) prior to operating the implant tool to ionize the xenon. As indicated above with respect to claim 1, this three-step ionization process set forth in dependent claim 14 is not disclosed nor suggested in the art of record.

Independent claim 23 is likewise believed to be allowable over the art of record. Independent claim 23 involves the steps of mounting a substrate in an implantation tool, and performing a three-step ionization process. The first ionization process is to implant a first species of dopants into the substrate, the second implantation step is operated to ionize xenon to substantially amorphize a portion of the crystalline region, and the third ionization step is performed to ionize a second species of dopants that will be implanted into the substantially amorphized regions. As set forth above, it is respectfully submitted that the art of record does not disclose such a three-step ionization process that is performed for the reasons recited in independent claim 23. Dependent claim 27 further limits claim 23 by requiring that, prior to amorphizing a portion of the crystalline region, the tool is operated to ionize xenon when the substrate is removed from the tool to reduce residue of the first dopant species. This limitation is certainly not disclosed nor suggested in the art of record.

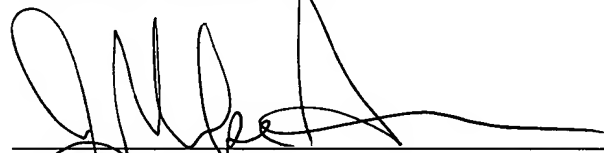
As shown above, it is respectfully submitted that the art of record does not disclose each and every limitation of the amended claims. Accordingly, the claims are not anticipated by the prior art. Moreover, it is respectfully submitted that any attempt to assert that the amended claims as set forth herein would be obvious in view of the art of record would be legally improper in many respects. First, any such combination of art would not teach all of the claim limitations. Accordingly, any such obviousness argument would be legally improper. Moreover, there is no suggestion in the art of record to modify the art so as to arrive at the entirety of Applicants' claimed invention. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a

suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to assert that the claims presently pending in the application would be obvious in view of the art of record would necessarily involve an improper use of hindsight using Applicants' disclosure as a roadmap.

For the aforementioned reasons, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

WILLIAMS, MORGAN & AMERSON
CUSTOMER NO. 23720

A handwritten signature in black ink, appearing to read 'J. Mike Amerson', is written over a horizontal line.

Date: March 2, 2005

J. Mike Amerson
Reg. No. 35,426
10333 Richmond, Suite 1100
Houston, Texas 77042
(713) 934-4056
(713) 934-7011 (facsimile)

ATTORNEY FOR APPLICANTS